



July 7, 2006

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JUL 13 2006

Dan Pitman, P.E.
Idaho Department of Environmental Quality
1410 North Hilton
Boise, Idaho 83706

Department of Environmental Quality
State Air Program

RE: Response to June 5, 2006 Incompleteness Letter for Facility ID No. 033-00002, RDO Processing, LLC, Dubois Facility-Wide Tier II Operating Permit Application

Dear Mr. Pitman:

On June 5, 2006 the Idaho Department of Environmental Quality (DEQ) determined that the facility wide permit application for modifying the plant boiler was incomplete. DEQ requested additional information as listed below; RDO's responses follow DEQ's requests. In addition, RDO has re-evaluated the applicability of the recent requirements contained in New Source Performance Standards (NSPS) Subpart Db. RDO's compliance with the new requirements is discussed in detail below.

RDO Responses to DEQ's Questions

Below is DEQ's requested information with RDO's responses:

- 1) Stack heights for Boiler No. 1 and stack height and configuration for the four National Dryers. The stack heights used in the modeling are inconsistent with heights mandated by Permit Condition 3.15 of the current operating permit (T2-050511). These stack height requirements were not modified by Consent Order E-060001:

- Boiler #1, stack was required to be raised to 45 feet AGL. Modeled: Height of 34.92 ft.
- National Dryer stacks were required to have a vertical discharge, no cap, with stack height raised to at least height of 46 ft AGL. Modeled: Horizontal discharge, height of 36 ft.

RDO Response: RDO modified the stack heights as required in T2-050511 and notified DEQ in a January 5, 2006 letter to Aaron Swift of DEQ. The modified stack height for the boiler is included in the revised modeling enclosed with this letter. Note that the National Dryer is still modeled as horizontal, but this is more conservative than the actual stack height and orientation.

- 2) Boiler No. 1 exhaust parameters, including documentation and assumptions. The modeled exhaust temperature of 585°F for the Boiler #1 stack is inconsistent with the scrubber parameters shown in the application (inlet temperature of 350°F, scrubber outlet temperature of 123°F). It is also unclear whether the Boiler #1 stack velocity accounts for the additional moisture, changes in density, etc. that would be associated with using a lime slurry scrubber.

RDO Response: The boiler stack temperature is 123 °F. The boiler stack exhaust flow rate is 43,453 acfm out of the stack from the scrubber. This exhaust flow rate accounts for lime slurry characteristics. The revised modeling enclosed with this letter includes this exhaust flow rate. Documentation as provided by the scrubber vendor, Innovative Scrubber Solutions, is enclosed with this letter and replaces Appendix B in the original application submittal.

- 3) Stack height for Propane Heater 3. This is shown on page 3-17 of the application as 35.58 feet, but shown as 34.58 feet in the Appendix A Model Source Data sheet.

RDO Response: The propane heater stack height should be 35.58 feet. The revised modeling includes this stack height.

- 4) Revised facility-wide modeling, as needed, to reflect actual stack heights, temperatures, and exhaust characteristics.

RDO Response: The revised modeling files and report are enclosed with this letter.

- 5) Documentation for PM₁₀ capture efficiency for the new scrubber. This is described as being 25 percent (application, p. 3-3), 8 percent (application Section 5, emission inventory), and "unknown" (application Section 10, Proposed Scrubber Information).

RDO Response: See discussion below. The PM/PM₁₀ emission rate is based on the NSPS Subpart Db standard of 0.03 lb/MMBTU. At 150 MMBTU/hr the mass hourly emission rate is 4.5 lb/hr. RDO certifies that it will meet this NSPS requirement; a venturi will be installed with the scrubber to meet the NSPS requirement. The revised modeling includes this PM/PM₁₀ emission rate.

- 6) PM₁₀ emission factor for Boiler No. 1. The application notes that the emission rate of 15.58 lb per 1,000 gallons of residual fuel was based on a November 3-4, 2006, (sic, test was run in 2005) stack test. DEQ has already notified RDO that determining PM₁₀ emissions by applying the Coulter method to the November stack test results is not appropriate, (letter, Rensay Owen to Jan Nel, dated February 9, 2006). DEQ determined that the PM₁₀ emissions rate based on that stack test was about 17 lb. per 1,000 gallons of residual fuel.

RDO Response: See response to #5 above and discussion on NSPS Subpart Db applicability below.

- 7) Heat release rate for Boiler No. 1, which is needed to support the selection of the NSPS Subpart Db NO_x limit.

RDO Response: The heat release is 73,400 BTU/hr-ft³. This meets the 40 CFR 60.41b definition of high heat release because the heat release is greater than 70,000 BTU/hr-ft³.

NSPS Subpart Db Applicability

Subsequent to the original submittal of the facility wide permit application, RDO has re-examined the applicability of the new requirements of NSPS Subpart Db, Standards of Performance for Industrial – Commercial – Institutional Steam Generating Units. RDO has determined that it will comply with new requirements for modifications of boilers that occurred after February 28, 2005. In particular RDO will comply with the PM and SO₂ standards as follows.

§ 60.43b Standard for particulate matter.

* * * * *

(h)(1) On or after the date on which the initial performance test is completed or is required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that commences construction, reconstruction, or modification after February 28, 2005, and that combusts coal, oil, gas, wood, a mixture of these fuels, or a mixture of these fuels with any other fuels shall cause to be discharged into the atmosphere from that affected facility any gases that contain particulate matter emissions in excess of 13 ng/J (0.030 lb/MMBtu) heat input, except as provided in paragraphs (h)(2), (h)(3), (h)(4), and (h)(5).

§ 60.42b Standard for sulfur dioxide.

* * * * *

(k) On or after the date on which the initial performance test is completed or is required to be completed under §60.8, whichever date comes first, no owner or operator of an affected facility that commences construction or reconstruction after February 28, 2005, and that combusts coal, oil, gas, a mixture of these fuels, or a mixture of these fuels with any other fuels shall cause to be discharged into the atmosphere any gases that contain sulfur dioxide in excess of 87 ng/J (0.20 lb/MMBtu) heat input or 8 percent (0.08) of the potential sulfur dioxide emission rate (92 percent reduction) and 520 ng/J (1.2 lb/MMBtu) heat input, except as provided in paragraphs (k)(1) or (k)(2). Affected facilities subject to this paragraph are also subject to paragraphs (e) through (g) of this section.

For SO₂, RDO opts to demonstrate compliance with the standard by achieving 92% reduction (or 8% of the emission rate) of uncontrolled SO₂ emissions. For PM/PM₁₀, RDO will comply with the 0.03 lb/MMBTU standard. Emission calculations have been updated for SO₂ and PM/PM-10 based on these NSPS requirements; the updated calculations are enclosed. The guarantee by Innovative Scrubber Solutions for these standards is enclosed with this letter.

We believe this letter fulfills the incompleteness requests by DEQ. We have enclosed updates to the application based on the discussions in this letter. If you have questions or need additional information, please contact me at 208.374.5600 or Daniel Heiser of JBR Environmental Consultants, Inc. at 208.853.0883.

I certify that based on the information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate and complete.

Sincerely,



Jan Nel
Plant Manager

Enclosures

cc: Rensay Owen
Regional Air Quality Manager
Department of Environmental Quality
900 N. Skyline, Suite B
Idaho Falls, ID 83402

Daniel Heiser
JBR Environmental Consultants, Inc.

STATE OF IDAHO

APPLICATION TO CONSTRUCT AN AIR POLLUTION EMITTING FACILITY

SECTION 2: FUEL-BURNING EQUIPMENT (*complete a separate page for each unit*)

1. APPLICANT'S REFERENCE NUMBER Boiler #1																															
2. EQUIPMENT MANUFACTURER AND MODEL NUMBER Wabash Power Equipment Co., Model No.: NS-F-89-ECON, Serial No. D-3465		3. RATED HEAT INPUT CAPACITY 150 MMBTU/hr primary	4. BURNER UNIT TYPE (use code) 9. Horizontally fired																												
6. FUEL DATA <table border="1"> <tr> <td rowspan="2">fuel type (use code)*</td> <td>Primary</td> <td>Secondary</td> </tr> <tr> <td>2. #6 Residual Fuel Oil</td> <td>5. Propane</td> </tr> <tr> <td>percent sulfur</td> <td>1.75 %</td> <td>0.15 gr/dscf</td> </tr> <tr> <td>percent ash</td> <td>0.05%</td> <td>0%</td> </tr> <tr> <td>percent nitrogen</td> <td>0.15%</td> <td>0%</td> </tr> <tr> <td>percent carbon</td> <td>88.6%</td> <td>81.8%</td> </tr> <tr> <td>percent hydrogen</td> <td>10.4%</td> <td>18.2%</td> </tr> <tr> <td>percent moisture</td> <td>0.05%</td> <td>0%</td> </tr> <tr> <td>heat content (percent by weight or volume)</td> <td>150,000 BTU/gal</td> <td>94,000 BTU/gal</td> </tr> <tr> <td colspan="3">All in % weight except sulfur for propane.</td> </tr> </table>		fuel type (use code)*	Primary	Secondary	2. #6 Residual Fuel Oil	5. Propane	percent sulfur	1.75 %	0.15 gr/dscf	percent ash	0.05%	0%	percent nitrogen	0.15%	0%	percent carbon	88.6%	81.8%	percent hydrogen	10.4%	18.2%	percent moisture	0.05%	0%	heat content (percent by weight or volume)	150,000 BTU/gal	94,000 BTU/gal	All in % weight except sulfur for propane.			5. HEAT USAGE % process % space heating 100 % process
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11. CRITERIA POLLUTANT ESTIMATED EMISSIONS (<u>Maximum</u> of all fuels is shown below) <table border="1"> <tr> <td>Particulates</td> <td>4.5 lb/hr</td> <td>19.7 tons/yr</td> <td>Nitrogen oxides</td> <td>48.93 lb/hr</td> <td>214.3 tons/yr</td> </tr> <tr> <td>Sulfur dioxide</td> <td>22.88 lb/hr</td> <td>100.2 tons/yr</td> <td>Volatile organic compounds</td> <td>1.33 lb/hr</td> <td>5.8 tons/yr</td> </tr> <tr> <td>Carbon monoxide</td> <td>5.21 lb/hr</td> <td>22.8 tons/yr</td> <td colspan="3"><i>(Include calculations and assumptions)</i></td> </tr> </table>		Particulates	4.5 lb/hr	19.7 tons/yr	Nitrogen oxides	48.93 lb/hr	214.3 tons/yr	Sulfur dioxide	22.88 lb/hr	100.2 tons/yr	Volatile organic compounds	1.33 lb/hr	5.8 tons/yr	Carbon monoxide	5.21 lb/hr	22.8 tons/yr	<i>(Include calculations and assumptions)</i>			10. STACK OR EXHAUST DATA <table border="1"> <tr> <td>Stack ID</td> <td>BOILER_1</td> </tr> <tr> <td>Height</td> <td>45 ft</td> </tr> <tr> <td>Exit diameter</td> <td>6.65 ft</td> </tr> <tr> <td>Exit gas volume</td> <td>43,453 acfm</td> </tr> <tr> <td>Exit gas temperature</td> <td>123 F</td> </tr> </table> <i>(Include a separate page for each stack if multiple stacks or vents are used)</i>	Stack ID	BOILER_1	Height	45 ft	Exit diameter	6.65 ft	Exit gas volume	43,453 acfm	Exit gas temperature	123 F	
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FUEL CODES 1. Natural gas 2. Oil (specify ASTM grade number) 3. Wood (specify chips, bark, shavings, sander dust) 4. Coal (specify bituminous, anthracite, lignite) 5. Other (specify) Propane		BURNER CODES 1. Spreader stoker 2. Chain or traveling grate 3. Hand fired 4. Cyclone furnace 5. Wet bottom (pulverized coal) 6. Dry bottom (pulverized coal) 7. Underfeed stoker 8. Tangentially fired 9. Horizontally fired 10. Other (specify)																													

Boiler No. 1 - Oil 1.75% Sulfur

Boiler No. 1 - Residual Oil (1.75% Sulfur)

Criteria Pollutant Estimates, >100 MMBTU/hr (AP-42, Tables 1.3-1, 1.3-2, and 1.3-3, 9/98)

	Pollutant				
	SO ₂	NO _x	CO	PM/PM-10 ^a	VOC ^b
Emission Factor, lb/1,000 gal	157	S ^c	47	5	4.3228
% S in fuel: 1.75					
Scrubber Efficiency 92%					
Maximum ^d gal/day 24,984					
Maximum gal/yr 9,119,160					
Emissions, lb/hr With Scrubber ^e	22.88	48.93	5.21	4.50	1.33
Emissions, lb/day With Scrubber ^f	549.15	1,174.25	124.92	108.00	31.98
Emissions, ton/yr With Scrubber	100.2	214.3	22.8	19.7	5.84
NSPS Subpart Db Requirement	92% reduction	0.4 lb/MMBTU ^g	NA	0.03 lb/MMBTU	NA
NSPS Subpart Db Requirement Met?	YES	YES	NA	YES	NA

Notes:

^aPM and PM-10 emission factor is based on meeting NSPS 0.03 lb/MMBTU

^bVOC assumed to be equal to TOC. Boiler size = industrial >100 MMBTU/hr

^cS = weight % sulfur in fuel

^dBoiler rated at 150 MMBtu/hr; Heat content of residual oil fuel = 18,000 Btu/lb;

^eScrubber efficiency for PM removal is 8 percent

^fScrubber efficiency for SO₂ removal is 90 percent

^g NSPS NOx standard based on boiler having high heat release rate

All calculations based on 8760 hours of operation each year

Boiler Propane

Criteria Pollutant Estimates, >100 MMBTU/hr (AP-42, Tables 1.5-1, 10/96)

	Pollutant				
	SO ₂	NO _X	CO	PM ^a	VOC ^b
Emission Factor, lb/1,000 gal	0.10 S ^c	19	3.2	0.6	0.5
S = 15					
Reduction in SO ₂ 92%					
Maximum ^d gal/day 38,304					
Maximum gal/yr 13,980,960					
Emissions, lb/hr No control	2.39	30.32	5.11	0.96	0.80
Emissions, lb/hr With Scrubber ^e	0.19			0.96	
Emissions, lb/day No control	57.46	727.78	122.57	22.98	19.15
Emissions, lb/day With Scrubber ^f	4.60			22.98	
Emissions, ton/yr No control	10.49	132.8	22.4	4.2	3.50
Emissions, ton/yr With Scrubber	0.839			4.2	
NSPS Subpart Db Requirement	92% reduction	NA	NA	0.03 lb/MMBTU	NA
NSPS Subpart Db Requirement Met?	YES	NA	NA	YES	NA

Notes:

^aPM and PM-10 emission factor is based on meeting NSPS 0.03 lb/MMBTU

^bVOC assumed to be equal to TOC. Boiler size = industrial >100 MMBTU/hr

^cS = sulfur fuel content in grains/100 ft³, assumed to be 15 (Reference: Gas Processors Association Engineering Data Book, Standard for Commercial Grade Propane)

^dBoiler rated at 150 MMBtu/hr; Heat content of propane fuel = 94,000 Btu/gal;

^eScrubber efficiency for PM removal is 8 percent

^fScrubber efficiency for SO₂ removal is 90 percent

All calculations based on 8760 hours of operation each year

Boiler No. 2 - Natural Gas

Criteria Pollutant Estimates, <100 MMBTU/hr (AP-42, Tables 1.4-1 and 1.4-2, 9/98)

	Pollutant				
	SO ₂	NO _X	CO	PM/PM-10 ^a	VOC
Emission Factor, lb/10 ⁶ scf	0.6	100	84	7.6	5.5
Maximum ^b scf/hr 6,381					
Maximum hrs/yr 8,760					
Emissions, lb/hr No control	0.0038	0.64	0.54	0.05	0.04
Emissions, ton/yr No control	0.017	2.79	2.35	0.21	0.15

Notes:

^aPM factor is sum of filterable PM plus condensable PM.

^bBoiler capacity is 6.7 MMBTU/hr, Heat content of natural gas = 1,050 BTU/scf;

Cyclone

Process Emissions

Emission Factor: AP-42 Table 9.9.1-2, Flaker Cyclone

PM Emission Factor lb/ton	PM-10 EF, lb/ton ^a	Product, lb/hr	Product, tpy ^b	PM, lb/hr	PM, tpy ^d	PM-10, lb/hr	PM-10, tpy
0.15	0.08	1,750	7,665	0.13	0.57	0.07	0.29

^aPM-10 can be estimated as 50% of PM per AP-42 Table 9.9.1-2, footnote g

^bBased on 8,760 hours of operation per year

Drum Dryers

PM Emission Factor is Based on April 7, 2005 Letter from DEQ to BLF

Main Stack	PM Emission Factor	PM-10 lb/ton	Product		PM, tpy ^b	PM-10, lb/hr	PM-10, tpy ^b
			Emission Factor lb/ton ^a	Throughput Rate lb/hr			
Drum Dyer 1	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 2	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 3	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 4	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 5	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 6	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 7	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 8	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 9	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 10	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 11	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Drum Dyer 12	2.60	2.60	1,500	6,570	1.95	8.54	1.95
Total drums 1-12:		18,000	78,840	23.40	102.49	23.40	102.49

^a PM-10 emission factor assumed to be equal to PM emission factor per December 23, 2004 Source Test Report.

^b Annual production =

8,760 hours per year.

National Dryer Process Emissions

PM Emission Factor is Based on April 7, 2005 Letter from DEQ to BLF

	Uncorrected PM/PM-10 Emission Factor lb/ton ^a	Product Throughput Rate lb/hr	Product Throughput Rate tpy ^b	PM/PM-10 Emission Rate lb/hr	PM/PM-10 Emission Rate tpy ^b
National Dryer A1	2.28	375	1,643	0.43	1.87
National Dryer A2	2.28	375	1,643	0.43	1.87
National Dryer B	2.28	375	1,643	0.43	1.87
National Dryer C	2.28	375	1,643	0.43	1.87
Total		1500	6,570	1.71	7.49

^aPM-10 emission factor assumed to be equal to PM emission factor per December 23, 2004 Source Test Report.

^bAnnual production = 8,760 hours per year.

Fluidized Bed Dryer

Criteria Pollutant Estimates for Fuel Combustion, <100 MMBTU/hr (Source: AP-42, Tables 1.4-1, 1.4-2, 9/98 edition and 1.5-1, 10/96 edition)

Natural Gas		Pollutant				Propane						
	SO ₂	NO _x	CO	PM/PM-10	VOC	SO ₂ ^a	NO _x	CO	PM/PM-10	VOC ^b		
Emission Factor, lb/10 ⁶ scf	0.6	100	84	7.6	5.5	Emission Factor, lb/1,000 gal	0.10	S ^c	14	1.9	0.4	0.5
						S = 15						
Maximum MMscf/hr						Maximum gal/hr						
4.50E-03						48.00						
Maximum hrs/yr						Maximum hrs/yr						
8,760						8,760						
Emissions, lb/hr	0.003	0.45	0.38	0.03	0.02	Emissions, lb/hr						
No control						No control	0.07		0.67	0.09	0.02	
Emissions, ton/yr	0.012	1.97	1.66	0.15	0.11	Emissions, ton/yr						
No control						No control	0.32		2.94	0.40	0.08	
											0.11	

Process Emissions

PM Emission Factor is Based on April 7, 2005 Letter from DEQ to BLF

PM Emission Factor lb/ton	PM-10 EF, Product, lb/ton ^c	Product, lb/hr	PM, tpy	PM, lb/hr	PM-10, lb/hr	PM-10, tpy
3.50	3.50	2,000	8,760	3.50	15.33	3,500

Total Maximum Emissions (Combustion + Process Emissions):

PM, lb/hr	PM, ton/yr	PM-10, lb/hr	PM-10, ton/yr	SO ₂ , lb/hr	SO ₂ , ton/yr	CO, lb/hr	CO, ton/yr	NO _x , lb/hr	NO _x , ton/yr	VOC, lb/hr	VOC, ton/yr
3.53	15.48	3.53	15.48	0.07	0.32	0.38	1.66	0.67	2.94	0.02	0.11

Fuel combustion assumed to run 24 hr/day

FBD size = 4.5 MMBTU/hr

^aS = sulfur fuel content in grains/100 ft³, assumed to be 15 (per the Gas Processors Association Engineering Data Book, standard for commercial grade propane).

^bVOC assumed to be equal to TOC.

^cPM-10 emission factor assumed to be equal to PM emission factor per December 23, 2004 Source Test Report.

Annual production = 8,760 hours per year.

SO₂ EMISSIONS FROM SULFITE IN DRYING PROCESS

Source	Fraction of Product Having Sulfite (lb Sulfite Product/lb Product)	Concentration (lb Sulfite/lb Sulfite Product) ^a	Fraction of Sulfite Converted to SO ₂ (lb SO ₂ /lb Sulfite) ^b	Throughput (lb Product/hr)	SO ₂ Emissions (lb/hr)	SO ₂ Emissions (t/yr)
Drum Dryer 1	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 2	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 3	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 4	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 5	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 6	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 7	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 8	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 9	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 10	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 11	0.12	0.0006	0.10	1500	0.011	0.047
Drum Dryer 12	0.12	0.0006	0.10	1500	0.011	0.047
National Dryer A1	0.90	0.0006	0.10	375	0.020	0.089
National Dryer A2	0.90	0.0006	0.10	375	0.020	0.089
National Dryer B	0.90	0.0006	0.10	375	0.020	0.089
National Dryer C	0.90	0.0006	0.10	375	0.020	0.089
Fluidized Bed Dryer	0.12	0.0006	0.10	2000	0.014	0.063
				TOTAL =	0.23	0.99

^aWorst-case scenario. Concentration varies between 0.0002 and 0.0006 lb Sulfite/lb Sulfite Product.

^bFrom Basic American Foods Tier II Operating Permit Application - Table C-6.

Flake Packaging

PM Emission Factor is Based on April 7, 2005 Letter from DEQ to BLF

	Controlled PM Emission Factor lb/ton	Controlled PM-10 Emission Factor lb/ton	Product Throughput Rate lb/hr	Product Throughput Rate tpy ^b	PM Emission Rate lb/hr	PM Emission Rate tpy ^b	PM-10 Emission Rate lb/hr	PM-10 Emission Rate tpy ^b
Flake Packaging Bulk Line	0.020	0.02000	12,000	52,560	0.120	0.53	0.120	0.53
Flake Packaging Line	0.020	0.02000	8,000	35,040	0.080	0.35	0.080	0.35
Flake Packaging Torit Line	0.020	0.02000	8,000	35,040	0.080	0.35	0.080	0.35
Flake Packaging Drum Negative Air Baghouse	0.020	0.02000	18,000	78,840	0.180	0.79	0.180	0.79
Total					0.46	2.01	0.46	2.01

^aPM-10 emission factor assumed to be equal to PM emission factor per December 23, 2004 Source Test Report.

^bAnnual production =

8760 hours per year

NATIONAL DRYERS

Criteria Pollutant Estimates, AP-42, Tables 1.5-1, 10/96

Criteria Pollutant Estimates, AP-42, Tables 1.4-1 and 1.4-2, 9/98

		Propane				
		Pollutant				
		SO ₂	NO _x	CO	PM	VOC ^a
Emission Factor, lb/1,000 gal	S ^b					
	0.1	14	1.9	0.4	0.5	
S =	15					
Maximum gal/hr						
39						
Maximum hrs/yr						
8,760						
Emissions, lb/hr						
No control	0.06	0.55	0.07	0.02	0.02	
Emissions, ton/yr						
No control	0.26	2.39	0.32	0.07	0.09	

Stage A1

		Pollutant				
		SO ₂	NO _x	CO	PM/PM-10	VOC
Emission Factor, lb/10 ⁶ scf	0.6	100	84	7.6	5.5	
Maximum MMscf/hr	3.60E-03					
Maximum hrs/yr	8,760					
Emissions, lb/hr	0.002	0.36	0.30	0.03	0.02	
Emissions, ton/yr No control	0.009					0.09
					1.32	0.12

NATIONAL DRYERS

Criteria Pollutant Estimates, AP-42, Tables 1.5-1, 10/96

Criteria Pollutant Estimates, AP-42, Tables 1.4-1 and 1.4-2, 9/98

Stage A2

Propane

Pollutant					
	SO ₂	NO _x	CO	PM	VOC ^a
Emission Factor, lb/1,000 gal	0.1	S ^b	14	1.9	0.4
S =					
Maximum gal/hr 39					
Maximum hrs/yr 8,760					
Emissions, lb/hr No control	0.06	0.55	0.07	0.02	0.02
Emissions, ton/yr No control	0.26	2.39	0.32	0.07	0.09

Natural Gas

Pollutant					
	SO ₂	NO _x	CO	PM/PM-10	VOC
Emission Factor, lb/10 ⁶ scf					
	0.6		100	84	7.6
					5.5
Maximum MMscf/hr 3.60E-03					
Maximum hrs/yr 8,760					
Emissions, lb/hr No control	0.002		0.36	0.30	0.03
Emissions, ton/yr No control	0.009		1.58	1.32	0.12
					0.09

NATIONAL DRYERS

Criteria Pollutant Estimates, AP-42, Tables 1.5-1, 10/96

Criteria Pollutant Estimates, AP-42, Tables 1.4-1 and 1.4-2, 9/98

Stage B

Propane

Pollutant					
	SO ₂	NO _x	CO	PM	VOC ^a
Emission Factor, lb/1,000 gal	0.1	S ^b	14	1.9	0.4
				0.5	
S =					
Maximum gal/hr 39					
Maximum hrs/yr 8,760					
Emissions, lb/hr No control	0.06	0.55	0.07	0.02	0.02
Emissions, ton/yr No control	0.26	2.39	0.32	0.07	0.09

Natural Gas

Pollutant					
	SO ₂	NO _x	CO	PM/PM-10	VOC
Emission Factor, lb/10 ⁶ scf			0.6		
			100	84	7.6
				5.5	
Maximum MMscf/hr 3.60E-03					
Maximum hrs/yr 8,760					
Emissions, lb/hr No control		0.002		0.36	0.03
Emissions, ton/yr No control	0.009		1.58	1.32	0.12
				0.09	

NATIONAL DRYERS

Criteria Pollutant Estimates, AP-42, Tables 1.5-1, 10/96

Criteria Pollutant Estimates, AP-42, Tables 1.4-1 and 1.4-2, 9/98

Stage C

Propane

		Pollutant				
		SO ₂	NO _x	CO	PM	VOC ^a
Emission Factor, lb/1,000 gal	S ^b	14	1.9	0.4	0.5	
S =						
Maximum gal/hr 39						
Maximum hrs/yr 8,760						
Emissions, lb/hr No control	0.06	0.55	0.07	0.02	0.02	
Emissions, ton/yr No control	0.26	2.39	0.32	0.07	0.09	

Natural Gas

		Pollutant				
		SO ₂	NO _x	CO	PM/PM-10	VOC
Emission Factor, lb/10 ⁶ scf		0.6		100	84	7.6
S =						
Maximum MMscf/hr 3.60E-03						
Maximum hrs/yr 8,760						
Emissions, lb/hr No control		0.002		0.36	0.30	0.03
Emissions, ton/yr No control		0.009		1.58	1.32	0.12

Total Maximum Emissions:

PM, lb/hr	PM, ton/yr	PM-10, lb/hr	PM-10, ton/yr	SO ₂ , lb/hr	SO ₂ , ton/yr	CO, lb/hr	CO, ton/yr	NOx, lb/hr	NOx, ton/yr	VOC, lb/hr	VOC, ton/yr
National Dryer A1	0.03	0.12	0.03	0.12	0.06	0.26	0.30	1.32	0.55	2.39	0.02
National Dryer A2	0.03	0.12	0.03	0.12	0.06	0.26	0.30	1.32	0.55	2.39	0.02
National Dryer B	0.03	0.12	0.03	0.12	0.06	0.26	0.30	1.32	0.55	2.39	0.02
National Dryer C	0.03	0.12	0.03	0.12	0.06	0.26	0.30	1.32	0.55	2.39	0.02

Note: Burner Capacity = 3.6 MMBTU/dryer

^aVOC assumed to be equal to TOC.

^bS = sulfur fuel content in grains/100 ft³, assumed to be 15 (per the Gas Processors Association Engineering Data Book, standard for commercial grade propane).

SPACE HEATERS

Criteria Pollutant Estimates, AP-42, Tables 1.5-1, 10/96

Criteria Pollutant Estimates, AP-42, Tables 1.4-1 and 1.4-2, 9/98

Propane Heaters 1, 2 and 3							Natural Gas						
Propane				Pollutant			SO ₂				Pollutant		
	SO ₂	NO _x	CO	PM	VOC ^a		NO _x	CO	PM/PM-10	VOC			
Emission Factor, lb/1,000 gal	0.1	S ^b	14	1.9	0.4	0.5							
S =													
Maximum gal/hr 39							Maximum MMscf/hr 3.60E-03						
Maximum hrs/yr 8,760							Maximum hrs/yr 8,760						
Emissions, lb/hr No control	0.06	0.55	0.07	0.02	0.02		Emissions, lb/hr No control	0.002	0.68	0.30	0.03	0.02	
Emissions, ton/yr No control	0.26	2.39	0.32	0.07	0.09		Emissions, ton/yr No control	0.009	3.00	1.32	0.12	0.09	

^aVOC assumed to be equal to TOC.

^bS = sulfur fuel content in grains/100 ft³, assumed to be 15 (per the Gas Processors Association Engineering Data Book, standard for commercial grade propane).

Total Maximum Emissions:

	PM-10, lb/hr	PM-10, ton/yr	SO ₂ , lb/hr	SO ₂ , ton/yr	CO, lb/hr	CO, ton/yr	NOx, lb/hr	NOx, ton/yr	VOC, lb/hr	VOC, ton/yr	
Propane Heaters	0.03	0.12	0.03	0.12	0.06	0.26	0.30	1.32	0.68	3.00	0.02

Note: Capacity = 1.2 MMBTU/propane heater

Process Weight Calculations

Source	Process Weight, lb/hr*	E, Emission Limit, lb/hr	PM Emissions, lb/hr	Meet E?
Cyclone	1,750	3.972	0.13	Yes
Drum Dryer 1	7,500	9.512	8.54	Yes
Drum Dryer 2	7,500	9.512	8.54	Yes
Drum Dryer 3	7,500	9.512	8.54	Yes
Drum Dryer 4	7,500	9.512	8.54	Yes
Drum Dryer 5	7,500	9.512	8.54	Yes
Drum Dryer 6	7,500	9.512	8.54	Yes
Drum Dryer 7	7,500	9.512	8.54	Yes
Drum Dryer 8	7,500	9.512	8.54	Yes
Drum Dryer 9	7,500	9.512	8.54	Yes
Drum Dryer 10	7,500	9.512	8.54	Yes
Drum Dryer 11	7,500	9.512	8.54	Yes
Drum Dryer 12	7,500	9.512	8.54	Yes
Fluidized Bed Dryer	10,000	11.000	3.50	Yes
National Dryer	7,500	9.512	1.71	Yes
Flake Packaging Bulk Line	12,000	11.513	0.120	Yes
Flake Packaging Line	8,000	9.887	0.35	Yes
Flake Packaging Torit Line	8,000	9.887	0.35	Yes
Flake Packaging Drum Negative Air Baghouse	18,000	12.741	0.79	Yes

$$E = 0.045 * (PW)^{0.60} \quad E = \text{Emission Limit} \quad < 9,250 \text{ lb/hr PW}$$

$$E = 1.10 * (PW)^{0.25} \quad E = \text{Emission Limit} \quad \geq 9,250 \text{ lb/hr PW}$$

*A ratio of 5:1 raw/final product was used for the dryers.

TANKS 4.0.9d
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification: Larsen Tank 1
 City: Pocatello
 State: Idaho
 Company: Blaine Larsen Farms
 Dehydration Division
 Type of Tank: Horizontal Tank
 Description: 30,000 Gallon Fuel Tank

Tank Dimensions

Shell Length (ft): 64
 Diameter (ft): 20
 Volume (gallons): 30,000.00
 Turnovers: 211.05
 Net Throughput (gal/yr): 6,293,000.00
 Is tank Heated (y/n): N
 Is tank Underground (y/n): N

Paint Characteristics

Shell Color/Shade: Gray/Medium
 Shell Condition: Good

Breather Vent Settings

Vacuum Settings (psig): 0
 Pressure Settings (psig): 0

Meteorological Data used in Emissions Calculations: Pocatello, Idaho (Avg Atmospheric Pressure = 12.63 psia)

TANKS 4.0.9d
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Larsen Tank 1 - Horizontal Tank
Pocatello, Idaho

Mixture/Component	Month	Daily Liquid Sun. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Wt.	Liquid Mass Fract.	Vapor Mass Fract.	Mol Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Residual oil no. 6	All	55.44	44.27	66.62	49.43	0	0	0	190				Option 1: VP50 = 00003 VP60 387 = .00004

TANKS 4.0.9d
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: Annual

Larsen Tank 1 - Horizontal Tank
Pocatello, Idaho

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Residual oil no. 6	0.31	0.49	0.81

Emission Inventory

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 1. BOILER #1 - NON-CARCINOGENS

Pollutant	FUEL OIL			
	Emission Factor (lb/1,000 gal)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	5.25E-03	5.47E-03	2.39E-02	6.89E-04
Barium	2.57E-03	2.68E-03	1.17E-02	3.37E-04
Chromium	8.45E-04	8.80E-04	3.85E-03	1.11E-04
Cobalt	6.02E-03	6.27E-03	2.74E-02	7.90E-04
Copper	1.76E-03	1.83E-03	8.02E-03	2.31E-04
Ethylbenzene	6.36E-05	6.62E-05	2.90E-04	8.34E-06
Fluoride	3.73E-02	3.88E-02	1.70E-01	4.89E-03
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	3.00E-03	3.12E-03	1.37E-02	3.93E-04
Mercury	3*	2.88E-04	1.26E-03	3.63E-05
Moybdenum	7.87E-04	8.19E-04	3.59E-03	1.03E-04
Naphthalene	1.13E-03	1.18E-03	5.15E-03	1.48E-04
Pentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phosphorous	9.46E-03	9.85E-03	4.31E-02	1.24E-03
Selenium	15*	1.44E-03	6.31E-03	1.81E-04
1,1,1-Trichloroethane	2.4E-04	2.46E-04	1.08E-03	3.10E-05
Toluene	6.20E-03	6.45E-03	2.83E-02	8.13E-04
o-Xylene	1.09E-04	1.13E-04	4.97E-04	1.43E-05
Vanadium	3.18E-02	3.31E-02	1.45E-01	4.17E-03
Zinc	2.91E-02	3.03E-02	1.33E-01	3.82E-03

TABLE 2. BOILER #1 - CARCINOGENS

Pollutant	FUEL OIL			
	Emission Factor (lb/1,000 gal)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	1.32E-03	1.37E-03	6.02E-03	1.73E-04
Benzene	2.14E-04	2.23E-04	9.76E-04	2.81E-05
Beryllium	3*	2.88E-04	1E-03	4.E-05
Cadmium	3*	2.88E-04	1.26E-03	4.E-05
Chromium VI	2.48E-04	2.58E-04	1.13E-03	3.25E-05
Formaldehyde	3.30E-02	3.44E-02	2E-01	4.33E-03
Nickel	1.67E-06	1.74E-06	7.61E-06	2.19E-07
Benzo(a)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz(a)anthracene	4.01E-06	4.17E-06	2E-05	5.26E-07
Benzo(b,k)fluoranthene	1.48E-06	1.54E-06	6.75E-06	1.94E-07
Chrysene	2.38E-06	2.48E-06	1.09E-05	3.12E-07
Dibeno(a,h)anthracene	1.67E-06	1.74E-06	8E-06	2.19E-07
Indeno(1,2,3-cd)pyrene	2.14E-06	2.23E-06	9.76E-06	2.81E-07
Total PAHs	1.17E-05	1.22E-05	5.33E-05	1.53E-06

Notes: * Emission factor units in pounds per 1,000,000 MMBTU.

Emission estimates represent maximum emissions based on burning #2, #4, #5, or #6 fuel oil, and based on AP-42 Tables 1.3-9, 1.3-10, and 1.3-11 (except nickel).

Nickel estimates based on maximum fuel oil nickel concentration from fuel supplier.

Emissions based on boiler operating with maximum fuel usage of 641 gal/hour.

Emissions based on 8,760 hours/year of operation.

TOXIC AIR POLLUTANT CALCULATIONS
TABLE 3. BOILER #2 - NON-CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	2.8E-05	1.2E-04	3.5E-06
Chromium	1.4E-03	8.9E-06	3.9E-05	1.1E-06
Cobalt	8.4E-05	5.4E-07	2.3E-06	6.8E-08
Copper	8.5E-04	5.4E-06	2.4E-05	6.8E-07
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	1.1E-02	5.0E-02	1.4E-03
Manganese	3.8E-04	2.4E-06	1.1E-05	3.1E-07
Mercury	2.6E-04	1.7E-06	7.3E-06	2.1E-07
Molybdenum	1.1E-03	7.0E-06	3.1E-05	8.8E-07
Naphthalene	6.1E-04	3.9E-06	1.7E-05	4.9E-07
Pentane	2.6E+00	1.7E-02	7.3E-02	2.1E-03
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.5E-07	6.7E-07	1.9E-08
Toluene	3.4E-03	2.2E-05	9.5E-05	2.7E-06
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Vanadium	2.3E-03	1.5E-05	6.4E-05	1.8E-06
Zinc	2.9E-02	1.9E-04	8.1E-04	2.3E-05

TABLE 4. BOILER #2 - CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.0E-04	1.3E-06	5.6E-06	1.6E-07
Benzene	2.1E-03	1.3E-05	5.9E-05	1.7E-06
Beryllium	1.2E-05	7.7E-08	3.4E-07	9.6E-09
Cadmium	1.1E-03	7.0E-06	3.1E-05	8.8E-07
Chromium VI	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	4.8E-04	2.1E-03	6.0E-05
Nickel	2.1E-03	1.3E-05	5.9E-05	1.7E-06
Benzo(a)pyrene	1.2E-06	7.7E-09	3.4E-08	9.6E-10
Benz(a)anthracene	1.8E-06	1.1E-08	5.0E-08	1.4E-09
Benzo(b)fluoranthene	1.8E-06	1.1E-08	5.0E-08	1.4E-09
Benzo(k)fluoranthene	1.8E-06	1.1E-08	5.0E-08	1.4E-09
Chrysene	1.8E-06	1.1E-08	5.0E-08	1.4E-09
Dibenzo(a,h)anthracene	1.2E-06	7.7E-09	3.4E-08	9.6E-10
Indeno(1,2,3-cd)pyrene	1.8E-06	1.1E-08	5.0E-08	1.4E-09
Total PAHs	1.1E-05	7.3E-08	3.2E-07	9.2E-09

Notes: Emissions based on boiler operating at maximum rate of 6.7 MMBTU/hr.

Assumed 1,050 BTU/scf heat content of natural gas.

Emissions based on 8,760 hours/year of operation.

Source: AP-42 Tables 1.4-3 and 1.4-4, 7/98.

Note: For small natural gas boiler

TOXIC AIR POLLUTANTS CALCULATIONS

**TABLE 1. FLUIDIZED BED DRYER - NON-CARCINOGENS
NATURAL GAS**

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Antimony	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Barium	4.4E-03	2.0E-05	8.7E-05	2.5E-06
Chromium	1.4E-03	6.3E-06	2.8E-05	7.9E-07
Cobalt	8.4E-05	3.8E-07	1.7E-06	4.8E-08
Copper	8.5E-04	3.8E-06	1.7E-05	4.8E-07
Ethylbenzene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluoride	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Hexane	1.8E+00	8.1E-03	3.5E-02	1.0E-03
Manganese	3.8E-04	1.7E-06	7.5E-06	2.2E-07
Mercury	2.6E-04	1.2E-06	5.1E-06	1.5E-07
Molybdenum	1.1E-03	5.0E-06	2.2E-05	6.2E-07
Naphthalene	6.1E-04	2.7E-06	1.2E-05	3.5E-07
Pentane	2.6E+00	1.2E-02	5.1E-02	1.5E-03
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.1E-07	4.7E-07	1.4E-08
1,1,1-Trichloroethane	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Toluene	3.4E-03	1.5E-05	6.7E-05	1.9E-06
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Vanadium	2.3E-03	1.0E-05	4.5E-05	1.3E-06
Zinc	2.9E-02	1.3E-04	5.7E-04	1.6E-05

**TABLE 2. FLUIDIZED BED DRYER - CARCINOGENS
NATURAL GAS**

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.00E-04	9.0E-07	3.9E-06	1.1E-07
Benzene	2.1E-03	9.5E-06	4.1E-05	1.2E-06
Beryllium	1.20E-05	5.4E-08	2.4E-07	6.8E-09
Cadmium	1.10E-03	5.0E-06	2.2E-05	6.2E-07
Chromium VI	0.00E+00	0.0E+00	0.0E+00	0.0E+00
Formaldehyde	7.5E-02	3.4E-04	1.5E-03	4.3E-05
Nickel	2.1E-03	9.5E-06	4.1E-05	1.2E-06
Benzo(a)pyrene	1.2E-06	5.4E-09	2.4E-08	6.8E-10
Benz(a)anthracene	1.8E-06	8.1E-09	3.5E-08	1.0E-09
Benzo(b)fluoranthene	1.8E-06	8.1E-09	3.5E-08	1.0E-09
Benzo(k)fluoranthene	1.8E-06	8.1E-09	3.5E-08	1.0E-09
Chrysene	1.8E-06	8.1E-09	3.5E-08	1.0E-09
Dibenzo(a,h)anthracene	1.2E-06	5.4E-09	2.4E-08	6.8E-10
Indeno(1,2,3-cd)pyrene	1.8E-06	8.1E-09	3.5E-08	1.0E-09
Total PAHs	1.1E-05	5.1E-08	2.2E-07	6.5E-09

Source: AP-42 Tables 1.4-3 and 1.4-4, 7/98.

Notes: Emissions based on operating at maximum rate of 4,500 cu. ft./hr.

Emissions based on 8,760 hours/year of operation.

TOXIC AIR POLLUTANT EMISSION INVENTORY

TABLE 1. NON-CARCINOGENS
Screening

Pollutant	Max. Hourly Emissions (lb/hr)	Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Antimony	5.47E-03	3.3E-02	N	2.39E-02
Barium	2.80E-03	3.3E-02	N	1.22E-02
Chromium	9.20E-04	3.3E-02	N	3.99E-03
Cobalt	6.27E-03	3.3E-03	Y	2.75E-02
Copper	1.86E-03	6.7E-02	N	8.11E-03
Ethylbenzene	6.62E-05	2.9E+01	N	2.90E-04
Fluoride	3.88E-02	1.67E-01	N	1.70E-01
Hexane	5.20E-02	1.2E+01	N	2.28E-01
Manganese	3.13E-03	3.33E-01	N	1.37E-02
Mercury	2.96E-04	3.E-03	N	1.29E-03
Molybdenum	8.51E-04	6.67E-01	N	3.70E-03
Naphthalene	1.19E-03	3.33E+00	N	5.21E-03
Pentane	7.51E-02	1.18E+02	N	3.29E-01
Phosphorous	9.85E-03	7.E-03	Y	4.31E-02
Selenium	1.44E-03	1.3E-02	N	6.31E-03
1,1,1-Trichloroethane	2.67E-04	1.3E+02	N	1.08E-03
Toluene	6.53E-03	2.5E+01	N	2.86E-02
o-Xylene	1.28E-04	2.9E+01	N	4.97E-04
Vanadium	3.33E-02	3.0E-03	Y	1.45E-01
Zinc	3.09E-02	6.67E-01	N	1.36E-01

TABLE 2. CARCINOGENS
Screening

Pollutant	Max. Hourly Emissions (lb/hr)	Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Arsenic	1.38E-03	1.5E-06	Y	6.04E-03
Benzene	2.83E-04	8.0E-04	N	1.18E-03
Beryllium	2.88E-04	2.8E-05	Y	1.26E-03
Cadmium	3.20E-04	3.7E-06	Y	1.37E-03
Chromium VI	2.58E-04	5.6E-07	Y	1.13E-03
Formaldehyde	3.65E-02	5.1E-04	Y	1.58E-01
Nickel	6.24E-05	2.7E-05	Y	2.66E-04
Benzo(a)pyrene	3.47E-08	2.0E-06	N	1.52E-07
Benz(a)anthracene	4.23E-06	NA	NA	1.85E-05
Benzo(b,k)fluoranthene	1.59E-06	NA	NA	6.93E-06
Chrysene	2.53E-06	NA	NA	1.10E-05
Dibenzo(a,h)anthracene	1.79E-06	NA	NA	7.79E-06
Indeno(1,2,3-cd)pyrene	2.26E-06	NA	NA	9.88E-06
Total PAHs	1.22E-05	2.0E-06	Y	5.34E-05

HAPs Inventory	
Pollutant	Emissions (tons/yr)
Arsenic	6.04E-03
Benzene	1.18E-03
Beryllium	1.26E-03
Cadmium	1.37E-03
Ethylbenzene	2.90E-04
Formaldehyde	1.58E-01
Chromium	1.13E-03
Lead	1.18E-04
Mercury	1.29E-03
1,1,1 - Trichlorethane (Methyl Chloroform)	1.08E-03
Naphthalene	5.21E-03
Nickel	2.66E-04
Xylene	4.97E-04
Selenium	6.31E-03
Toluene	2.86E-02
Phosphorus	4.31E-02
POM	1.98E-06
Dichlorobenzene	2.70E-05
Hexane	4.05E-02
Total	2.96E-01

Note: Emission Factors for lead, POM, dichlorobenzene and hexane are as follows (i.e., for those HAPs not listed above):

Lead	1.20E-07	lb/gal
	5.00E-04	lb/MMscf
POM	8.82E-05	lb/MMscf
Dichlorobenzene	1.20E-03	lb/MMscf
Hexane	1.8	lb/MMscf

DESIGN CONDITIONS

INLET DATA: Design (1.75% S)

Gas Volume (ACFM)	55,090
Gas Weight (#/hr)	136,316
Water Vapor Content (% volume)	8
Gas Temperature (°F)	350
Gas Pressure (inches WC)	16
Wet Molecular Weight (#/# mol)	29.306
Gas Density (#/ft3)	0.0412
Particulate (lb/hr)	8.24
SO ₂ (lb/hr)	264

OUTLET DATA:

Gas Volume (ACFM)	43,453
Gas Weight (#/hr)	144,699
Water Vapor Content (% volume)	15.1
Gas Temperature (°F)	123
Gas Pressure (inches WC)	0
Wet Molecular Weight (#/# mol)	28.4
Gas Density (#/ft3)	0.0555
Particulate (#/mmbtu)	0.03
SO ₂ (lb/hr)	21.12

OPERATING DATA

Gas Pressure:

Pressure into scrubber (inches WC)	14 -16
Pressure drop across absorber (inches WC)	14 -16

Liquid Rates:

Absorber Recycle Flow (GPM)	2600
Absorber Spray Pressure (PSIG)	25
Venturi Recycle Flow (GPM)	440
Venturi Liquid Pressure (PSIG)	5-6
Mist Eliminator Flow (GPM intermittent)	35
Mist Eliminator Pressure (PSIG)	30
Bleed Flow (GPM)	9.85
Water Evaporation (GPM)	14
Lime Slurry @ 20% (GPM)	2.71

EQUIPMENT DESCRIPTION

1. **SPRAY ABSORBER**- 3/16" 316L construction with a 317LM inlet, four banks of 316L spray headers, Bete 316 SS ST spray nozzles with stellite tips and two chevron mist eliminators with wash headers. Approximately 9'-6" diameter X 45'-0" tall.
2. **RECYCLE/ FORCED OXIDATION TANK**- 3/16" and 1/4" thick 316L with 304L stainless steel stiffeners. Approximately 14'-0" diameter X 22'-0" tall. Sized for 8-minute retention.
3. **VENTURI**- The Venturi consists of a vertical cylindrical vessel with flanged inlet, converging section, throat, diverging section and flooded elbow. Below the inlet are four (4) tangential liquid inlets creating a so-called wet (flooded) approach. A round cross-section, extended length throat is provided for long gas to liquid contact time and efficient scrubbing. Two (2) radial liquid inlets with inserts are provided to insure throat coverage. The throat has a butterfly damper blade with an electric actuator and positioner to maintain a constant pressure drop during changing gas volume.

Material of Construction:

Venturi	316L Stainless Steel
Plate Thickness	3/16"
External Stiffeners	304L Stainless Steel
Height	16'- 2"
Inlet Diameter	4'-3"

EMISSION GUARANTEE

When operated in accordance with the Design Conditions and Operating Data specified in this document and the Operating and Maintenance Manual provided, the scrubber performance will be:

Remove 92% of the inlet SO₂, have an instantaneous emission of not more than 0.2 pounds per million BTU of heat input.

Outlet particulate emission will be less than 0.03 lbs/mmbtu

If guarantee tests are not completed within 3 months after start-up or 12 months after shipment, whichever occurs first, this Emission Guarantee shall be deemed fulfilled. This assumes delay is for reasons that are not the fault of ISS

6.0 AMBIENT AIR QUALITY IMPACT ANALYSIS

This section describes the estimated ambient air quality impact from the proposed modification. Air dispersion modeling has been conducted for this facility in order to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) for criteria pollutants in 40 CFR 51. Toxic air pollutants were also evaluated against threshold emissions levels (ELs), and ambient concentrations for those pollutants exceeding their respective ELs were modeled and compared to the Acceptable Ambient Concentrations (AAC) or Acceptable Ambient Concentrations for Carcinogens (AACC) given in the IDEQ's *Rules for the Control of Air Pollution* (IDAPA 58.01.01) Sections 585 and 586, respectively.

Modeling was generally conducted in accordance with EPA's *Guideline on Air Quality Models* and the Idaho Department of Environmental Quality's (IDEQ) *Air Quality Modeling Guideline*. Meteorological data and ambient air boundaries were discussed with and approved by IDEQ modeling representative Kevin Schilling.

A description of the facility is given in Section 6.1. Details of the model input data, including emission unit information, meteorological data, receptor descriptions, and modeling options are given in Section 6.2. A description of the modeling analysis and results are given in Section 6.3.

6.1 Facility Description

The facility is a potato dehydration plant located approximately seven miles south of Dubois in Clark County, Idaho. The dehydration plant is located in Section 28, Township 9 North, Range 36 East, at Universal Transverse Mercator (UTM) Zone 12 coordinates of 402.4 km east, 4881.8 km north. The terrain surrounding the plant is fairly flat, gently sloping downward from north to south. Elevated terrain is primarily to the north and east of the facility.

Emission units at the facility include the following:

- Two boilers (emission units BOILER_1 and BOILER_2)
- Twelve drum dryers (emission units DRUM1 through DRUM12)
- One National Dryer (dehydrator) with four exhaust fans (emission units NAT_A1, NAT_A2, NAT_B, and NAT_C)
- One fluidized bed dryer (emission unit FBD_DYR)
- A flake packaging area (including emission units FP, FP_BULK, FP_TOR, and FP_BH)
- Three propane heaters in the receiving area (emission units REC_1, REC_2, and REC_3), and
- One cyclone (emission unit 04CYCLON)

The facility is a source of sulfur dioxide (SO₂), nitrogen oxides (NOx), volatile organic compounds (VOC), carbon monoxide (CO), and particulate matter (PM) from fuel combustion; and a source of SO₂ and PM from the drying process. Total lead emissions from the facility are well below the 0.6 tpy threshold requiring modeling in accordance with Table 1 of IDEQ's modeling guidelines.

A layout of the facility, showing the location of the point sources and buildings is given in Section 2 of this document in Figure 2-1. Figures 6-1 and 6-2 provide more details on the locations of the model sources and buildings for the north and south half of the plant, respectively.

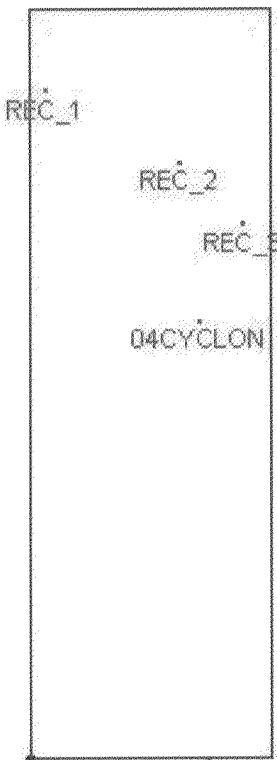


Figure 6-1 Model Source and Building Layout, North Half

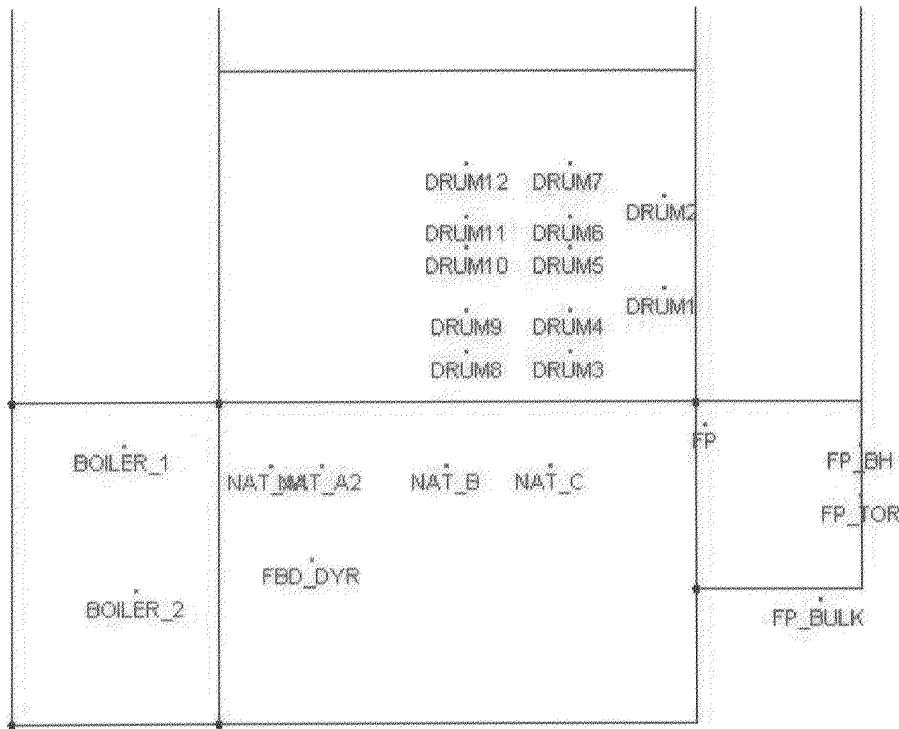


Figure 6-2 Model Source and Building Layout, South Half

Figure 2-2 in Section 2 of this permit application illustrates the ambient air boundary used for air quality modeling purposes in previous permit applications submitted for RDO. For this permit application, RDO has increased the north, east, and south ambient air boundaries approximately 1.5 miles beyond the previous boundaries in each of these directions. This action was approved by IDEQ modeling representative Kevin Schilling. RDO owns a large portion of the property surrounding the facility, and the defined ambient air boundary is well within those limits, and therefore justified.

Consistent with requirements under the national Homeland Security Act, employees are trained to notice and discourage unauthorized access. There are no residences within a mile of the property boundary used in this modeling analysis.

6.2 Model Input

The Industrial Source Complex Short-Term Version 3 Prime (ISCST3) model, version 04269, was used for this analysis. All modeling input and output files are included on the enclosed compact disc.

6.2.1 Model Options

Regulatory default modeling options were used, including stack tip downwash, final plume rise, calms processing, and buoyancy-induced dispersion. Since the area within a 3-km radius of the site is unpopulated agricultural land, rural dispersion coefficients were used. Elevated terrain was considered. Averaging times varied by pollutant and included the 1-hour, 3-hour, 8-hour, 24-hour, and annual averaging times. Modeling options are listed below in Table 6-1.

Table 6-1 Modeling Option Summary

Parameter	Setting
Regulatory Options	Regulatory Default
Dispersion	Rural, by Concentration
Terrain	Simple and Complex
Flagpole Receptors	None
Averaging Times	1-, 3-, 8-, and 24-hour; and/or annual (varies by pollutant)
Dispersion Output	Concentration ($\mu\text{g}/\text{m}^3$)
PRIME Option	Used; though no receptors were in or near the downwash zone

6.2.2 Emission and Source Data

Emission units at the facility and stack parameters are listed in Table 6-2.

Table 6-2 Emission Units and Stack Parameters

Stack No.	Stack ID	Type	Exit Direction	Height above ground			
				(ft)	(°F)	(ft/sec)	Diam. (ft)
1	BOILER_1	Boiler	V	45.0	123	20.8530	6.65
2	DRUM1	Drum Dryer 1	V w/cap	45.58	125	0.0033	3.58
3	DRUM2	Drum Dryer 2	V w/cap	45.58	125	0.0033	3.58
4	DRUM3	Drum Dryer 3	V w/cap	45.58	125	0.0033	3.58
5	DRUM4	Drum Dryer 4	V w/cap	45.58	125	0.0033	3.58
6	DRUM5	Drum Dryer 5	V w/cap	45.58	125	0.0033	3.58
7	DRUM6	Drum Dryer 6	V w/cap	45.58	125	0.0033	3.58
8	DRUM7	Drum Dryer 7	V w/cap	45.58	125	0.0033	3.58
9	DRUM8	Drum Dryer 8	V w/cap	45.58	125	0.0033	3.58
10	DRUM9	Drum Dryer 9	V w/cap	45.58	125	0.0033	3.58
11	DRUM10	Drum Dryer 10	V w/cap	45.58	125	0.0033	3.58
12	DRUM11	Drum Dryer 11	V w/cap	45.58	125	0.0033	3.58
13	DRUM12	Drum Dryer 12	V w/cap	45.58	125	0.0033	3.58
14	FBD_DYR	Fluidized Bed Dryer	H	39.42	110	0.0033	0.0033
15	NAT_A1	National Dryer Fan A1	H	46.00	150	0.0033	0.0033
16	NAT_A2	National Dryer Fan A2	H	46.00	176	0.0033	0.0033
17	NAT_B	National Dryer Fan B	H	46.00	167	0.0033	0.0033
18	NAT_C	National Dryer Fan C	H	46.00	148	0.0033	0.0033
19	FP_BULK	Flake Packaging Bulk Line	V	38.75	Ambient	326.4	0.33
20	FP	Flake Packaging	V	39.59	Ambient	18.6	4.00
21	FP_TOR	Flake Packaging Torit	V w/cap	33.92	Ambient	0.0033	0.25
22	FP_BH	Flake Packaging Drum Negative Air Baghouse	V	37.42	Ambient	108.3	1.53
23	REC_1	Propane Heater 1	V w/cap	35.38	90	0.0033	0.40
24	REC_2	Propane Heater 2	V w/cap	34.58	90	0.0033	0.40
25	REC_3	Propane Heater 3	V w/cap	35.58	90	0.0033	0.40
26	BOILER_2	Boiler #2	V	41.42	355	22.2	1.66
27	04CYCLON	Cyclone	Non-vertical	44.08	Ambient	0.0033	0.0033

All emission units emit from stacks and are therefore point sources. No area or volume sources are included in this modeling. In accordance with the IDEQ modeling guidelines, non-vertical stacks were given a default velocity of 0.001 meters per second (m/sec) and a default diameter of 0.001 meters to eliminate stack tip downwash effects. Vertical stacks with rain caps were given a default stack velocity of 0.001 m/sec. The previously non-vertical National Dryer stacks were very conservatively modeled with no vertical loft. The equivalent circular diameter of rectangular stacks was determined using the equation $\text{Area} = d^2\pi/4$, where d is the inside diameter of the stack.

6.2.3 Good Engineering Practice Stack Height and Building Downwash

Stacks that are lower than Good Engineering Practice (GEP) height may be influenced by the wake of nearby buildings and structures. Building downwash parameters were determined using the Building Profile Input Program (BPIP), and these parameters were incorporated into the modeling. Buildings that were included in the downwash calculations are shown in Figure 2-1.

6.2.4 Meteorological Data

IDEQ has specified the use of the Pocatello Municipal Airport surface data for 1991 combined with the concurrent Boise/Air Terminal mixing height data for this area. The surface data station number is 24156, the mixing height station number is 24131. This data has been downloaded from EPA's Support Center for Regulatory Air Models (SCRAM) website and processed using PCRAMMET. The anemometer height was assumed to be 10 meters. As recommended by IDEQ Modeling representative Kevin Schilling, the wind directions for Pocatello were altered by rotating them to be consistent with the terrain forcing in this area near the Continental Divide north of Idaho Falls. The final rotation employed was a 40 degree counterclockwise turn. Modeling for all pollutants was performed with one five year meteorological data file.

6.2.5 Receptor Network

The receptor network used for all modeling analyses included 25-meter spacing on and 25 meters beyond the ambient air boundary, 100 meter spacing from 25 meters beyond the boundary out to 200 meters from the boundary, 250 meter grid spacing out to 1500 meters from the boundary, and 500 meter grid spacing to 6000 meters from the boundary. That receptor spacing meets requirements in the IDEQ *Air Quality Modeling Guidelines* since all model predicted maximum impacts occurred on the ambient air boundary within the 25 meter receptor spacing. Figures 6-3 and 6-4 show the model ambient air boundary and inner receptor network, and the outer receptor network, respectively.

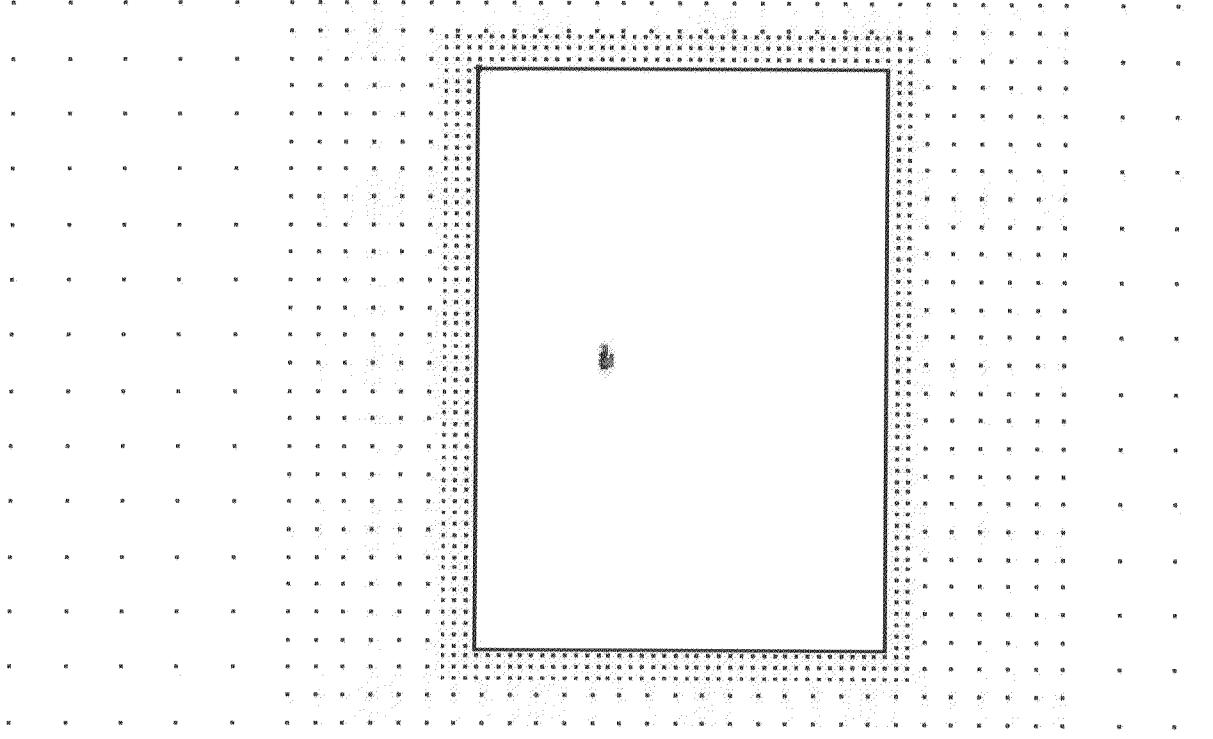


Figure 6-3 Model Ambient Air Boundary and Inner Receptor Network

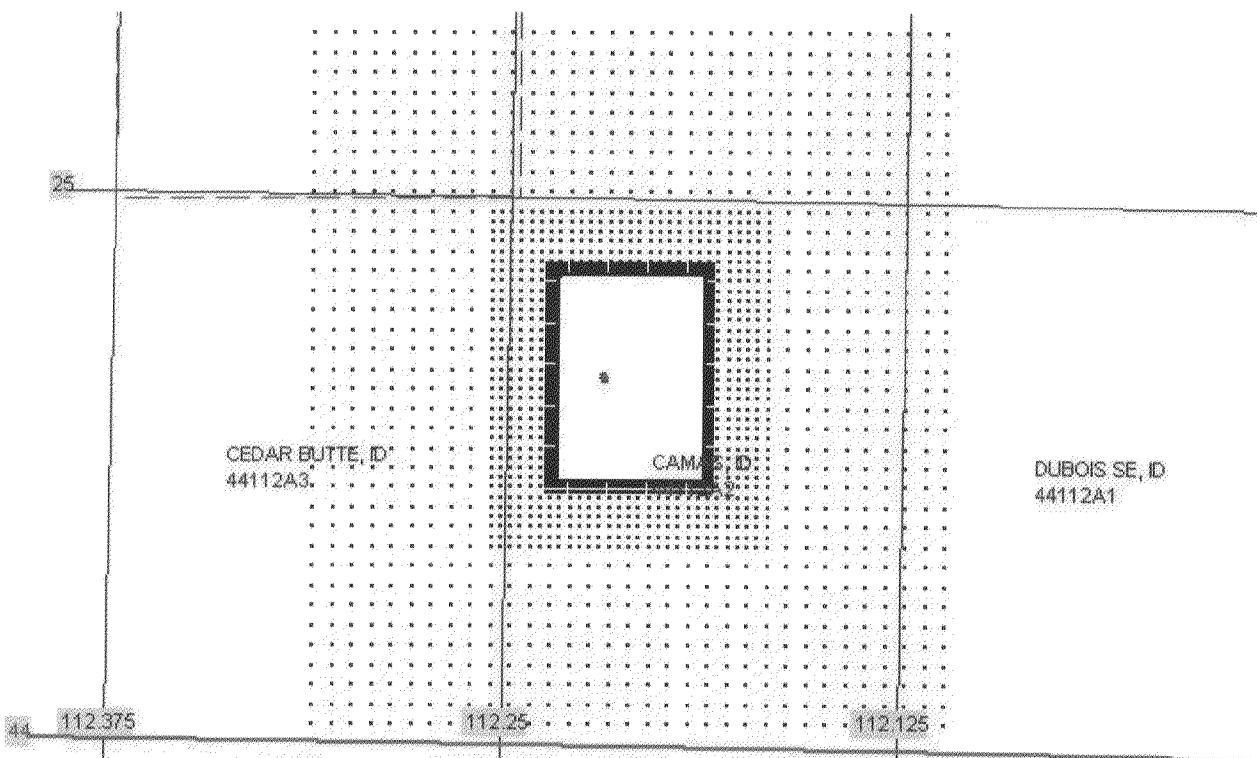


Figure 6-4 Model Outer Receptor Network

Terrain elevations for all receptors were obtained from United States Geological Survey (USGS) digitized elevation model (DEM) 30 meter resolution data.

6.3 Modeling and Results

The objective of the modeling analysis was to determine the maximum ambient concentrations of criteria pollutants for comparison with NAAQS, and the maximum impact of TAPs emitted above IDAPA 58.01.01.585 and 586 emission limits for comparison against their Acceptable Ambient Concentrations (AACs) for 585 TAPs or Acceptable Ambient Concentrations for Carcinogens (AACCs) for 586 TAPs. Ambient air background levels applicable to this area will be added to the air dispersion model output for criteria pollutants to provide comparisons of potential ambient concentrations with facility impacts to the NAAQS. The applicable NAAQS and the associated background concentrations used in this modeling, as prescribed by IDEQ, are shown in Table 6-3. Maximum model impacts reported are as conservative as required in IDEQ modeling guidance or more so: highest yearly second maximum over five years for all short term averaging periods except for TAPs, and maximum impact over five years for all annual averages and all TAPs.

Table 6-3 National Ambient Air Quality Standards and Background Concentrations

Pollutant	Averaging Period	NAAQS ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$)
PM ₁₀	Annual	50	26
	24-Hour	150	73
NO ₂	Annual	100	17
SO ₂	Annual	80	8
	24-Hour	365	26
	3-Hour	1300	34
CO	8-Hour	10,000	2,300
	1-Hour	40,000	3,600

Table 6-4 summarizes the modeling file names included in the analysis. Details of each run are given in the following sections.

6.3.2 NO₂ Modeling

The facility's NO_x sources were modeled for the annual averaging time. All emitted NO_x is assumed to be converted to NO₂ for this analysis. The results, the maximum annual average concentration predicted, are summarized in Table 6-6 below. The appropriate background concentrations have been added to determine compliance with NAAQS.

Table 6-6 NO₂ Modeling Results

	Maximum Modeled Impacts ($\mu\text{g}/\text{m}^3$)
	Annual
Maximum impact $\mu\text{g}/\text{m}^3$	4.82
Background $\mu\text{g}/\text{m}^3$	17
Maximum Ambient Concentration $\mu\text{g}/\text{m}^3$	21.82
NAAQS ($\mu\text{g}/\text{m}^3$)	100
Max Ambient as % of NAAQS	21.8%

The maximum impacts occur within the 25-meter grid, on the north boundary north of the plant, and all impacts are below NAAQS.

6.3.3 PM-10 Modeling

The facility's PM-10 sources were modeled for the annual and 24-hour averaging times. The results, the maximum annual average concentration predicted, and conservatively the second maximum over five years for the 24-hour averaging period are summarized in Table 6-7 below. The appropriate background concentrations have been added to determine compliance with NAAQS.

Table 6-7 PM-10 Modeling Results

	Maximum Modeled Impacts ($\mu\text{g}/\text{m}^3$)	
	Annual	24-hour
Maximum impact $\mu\text{g}/\text{m}^3$	3.3	47.2
Background $\mu\text{g}/\text{m}^3$	26	73
Maximum Ambient Concentration $\mu\text{g}/\text{m}^3$	29.3	120.2
NAAQS ($\mu\text{g}/\text{m}^3$)	50	150
% NAAQS	58.6%	80.1%

The maximum impacts occur within the 25-meter grid. The maximum predicted 24-hour impact occurred in 1987 on the west property boundary W of the plant, and the maximum predicted annual average impact occurred in 1988 on the west property boundary NNW of the plant. All impacts are well below the NAAQS.

6.3.4 CO Modeling

The facility's CO sources were modeled for the 1-hour and 8-hour averaging times. The results, conservatively the second maximum predicted impact over the five years modeled, are summarized in Table 6-8 below. All impacts are below significance levels; no further CO modeling is required.

Table 6-8 CO Modeling Results

	Maximum Modeled Impacts ($\mu\text{g}/\text{m}^3$)	
	1-hour	8-hour
Maximum $\mu\text{g}/\text{m}^3$	66	15
Significance Level ($\mu\text{g}/\text{m}^3$)	2000	500
% Significance	3.3%	3.0%

6.4 Summary

The modeling results indicate that criteria pollutant emissions from this facility will not cause or contribute to any exceedances of the NAAQS. Table 6-9 summarizes the results of the modeling demonstrating NAAQS compliance.

Table 6-9 Modeling Results Summary

Pollutant	Averaging Time	Location	Maximum $\mu\text{g}/\text{m}^3$	Backgrd $\mu\text{g}/\text{m}^3$	Total $\mu\text{g}/\text{m}^3$	NAAQS $\mu\text{g}/\text{m}^3$	% NAAQS
SO ₂	Annual	N bndy N of plant	2.53	8	10.053	80	13.2%
	3-hour	W bndy NW of plant	64.2	34	98.2	1300	7.6%
	24-hour	W bndy NNW of plant	12.5	26	38.5	365	10.6%
NO ₂	Annual	N bndy N of plant	4.82	17	21.82	100	21.8%
PM-10	Annual	N bndy W of plant	3.3	26	29.3	50	58.6%
	24-hour	W bndy NNW of plant	47.2	73	120.2	150	80.1%
CO	1-hour	W bndy NNW of plant	66	N/A (insignificant)			
	8-hour	W bndy NNW of plant	15	N/A (insignificant)			

7.0 DEMONSTRATION OF PRE-CONSTRUCTION COMPLIANCE WITH TOXIC STANDARDS

Table 7-1 summarizes the TAP emissions and the respective EL thresholds from IDAPA 58.01.01 585 and 586. Non-carcinogens which exceed the EL include cobalt, phosphorus, and vanadium. Carcinogens exceeding the EL are arsenic, beryllium, cadmium, chromium VI, formaldehyde, nickel, and total PAHs.

Table 7-1 TAPs Compared to the EL

NON-CARCINOGENS				
Pollutant	Max. Hourly Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Antimony	5.47E-03	3.3E-02	N	2.39E-02
Barium	2.80E-03	3.3E-02	N	1.22E-02
Chromium	9.20E-04	3.3E-02	N	3.99E-03
Cobalt	6.27E-03	3.3E-03	Y	2.75E-02
Copper	1.86E-03	6.7E-02	N	8.11E-03
Ethylbenzene	6.62E-05	2.9E+01	N	2.90E-04
Fluoride	3.88E-02	1.67E-01	N	1.70E-01
Hexane	5.20E-02	1.2E+01	N	2.28E-01
Manganese	3.13E-03	3.33E-01	N	1.37E-02
Mercury	1.25E-04	3.E-03	N	5.41E-04
Molybdenum	8.51E-04	6.67E-01	N	3.70E-03
Naphthalene	1.19E-03	3.33E+00	N	5.21E-03
Pentane	7.51E-02	1.18E+02	N	3.29E-01
Phosphorous	9.85E-03	7.E-03	Y	4.31E-02
Selenium	7.12E-04	1.3E-02	N	3.12E-03
1,1,1-Trichloroethane	2.67E-04	1.3E+02	N	1.08E-03
Toluene	6.53E-03	2.5E+01	N	2.86E-02
o-Xylene	1.28E-04	2.9E+01	N	4.97E-04
Vanadium	3.33E-02	3.0E-03	Y	1.45E-01
Zinc	3.09E-02	6.67E-01	N	1.36E-01

CARCINOGENS				
Pollutant	Max. Hourly Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Arsenic	1.38E-03	1.5E-06	Y	6.04E-03
Benzene	2.83E-04	8.0E-04	N	1.18E-03
Beryllium	2.93E-05	2.8E-05	Y	1.28E-04
Cadmium	4.46E-04	3.7E-06	Y	1.92E-03
Chromium VI	2.58E-04	5.6E-07	Y	1.13E-03
Formaldehyde	3.65E-02	5.1E-04	Y	1.58E-01
Nickel	6.24E-05	2.7E-05	Y	2.66E-04
Benzo(a)pyrene	3.47E-08	2.0E-06	N	1.52E-07
Benz(a)anthracene	4.23E-06	NA	NA	1.85E-05
Benzo(b,k)fluoranthene	1.59E-06	NA	NA	6.93E-06
Chrysene	2.53E-06	NA	NA	1.10E-05
Dibenzo(a,h)anthracene	1.79E-06	NA	NA	7.79E-06
Indeno(1,2,3-cd)pyrene	2.26E-06	NA	NA	9.88E-06
Total PAHs	1.22E-05	2.0E-06	Y	5.34E-05

Consistent with IDAPA 585 and 586 regulations, modeling was conducted for the 24-hour averaging time for the AAC evaluation and the annual averaging time for the AACC evaluation for all TAPs identified as emitted above the IDAPA Emission limits (ELs). The TAPs modeled included the IDAPA 585 non-carcinogens cobalt and vanadium, and the IDAPA 586 carcinogens arsenic, beryllium, cadmium, chromium VI, formaldehyde, nickel, and PAHs. The same model layout, parameters, options, meteorological data, and receptor network described for the criteria pollutant modeling were used for the TAP modeling.

Table 7-2 shows the modeled ambient concentrations which are compared to the AAC or AACC; compliance is demonstrated for all TAPs. All maximum predicted annual average impacts occurred on the north boundary north of the plant, and all maximum predicted 24-hour average impacts occurred on the west boundary NW or N-NW of the plant.

Table 7-2 TAPs Compared to the AAC or AACC (for those exceeding the EL)

Non-Carcinogens			
Pollutant	Modeled 24-hour µg/m ³	AAC µg/m ³	% AAC
Cobalt	0.00399	2.5	0.16%
Phosphorus	0.00626	5.0	< 0.1%
Vanadium	0.02111	5.0	0.4%

Carcinogen			
Pollutant	Modeled Annual µg/m³	tACC kg/m³	% AACC
Arsenic	1.30E-04	30E-04	56.2%
Beryllium	<1.0E-05	0E-03	<0.2%
Cadmium	4.00E-05	0E-04	7.1%
Chromium VI	2.00E-05	0E-05	24.1%
Formaldehyde	3.32E-03	0E-02	4.3%
Nickel	1.00E-05	0E-03	0.2%
Total PAHs	<1.0E-05	0E-02	<0.1%